

Claims

1. A vehicle steering system comprising a shaft coupling system including:
 - an input shaft for transmitting rotation from a steering wheel;
 - an intermediate shaft;
 - an output shaft for driving a steering mechanism on a vehicle body;
 - a constant velocity universal joint; and
 - a cross universal joint,

characterized in that:

one of the constant velocity universal joint and the cross universal joint connects the input shaft with the intermediate shaft; and

the other remainder of the constant velocity universal joint and the cross universal joint connects the intermediate shaft and the output shaft.
2. A vehicle steering system as set forth in Claim 1, characterized in that the constant velocity universal joint is a constant velocity ball universal joint.
3. A vehicle steering system as set forth in Claim 2, characterized in that the constant velocity ball universal joint connects

the input shaft and the intermediate shaft; and
the cross universal joint connects the intermediate
shaft with the output shaft.

5 4. A vehicle steering system as set forth in Claim 2
or 3, characterized in that a crossed axes angle of the
constant velocity ball universal joint is selected so
as to be larger than a crossed axes angle of the cross
universal joint.

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5. A vehicle steering system as set forth in Claim 1,
characterized in that the intermediate shaft comprises
an upper intermediate shaft, a lower intermediate shaft
and a connecting device for connecting the upper
15 intermediate shaft to the lower intermediate shaft in
such a manner as to enable to slide axial direction
thereof and to transmit a rotation therebetween.

6. A vehicle steering system comprising an
20 intermediate shaft system including:

an input shaft for transmitting a rotation from a
steering wheel;

an intermediate shaft including an upper
intermediate shaft, a lower intermediate shaft and a
25 connecting device for connecting the upper intermediate

shaft to the lower intermediate shaft in such a manner as to enable to slide axial direction thereof and to transmit a rotation therebetween;

an output shaft for driving a steering mechanism
5 on a vehicle; and

universal joints which provide connections, respectively, between the input shaft and the upper intermediate shaft and between the lower intermediate shaft and the output shaft,

10 characterized in that at least either of the universal joints is a constant velocity universal joint.

7. A vehicle steering system as set forth in Claim 6, characterized in that the universal joints are both
15 constant velocity universal joints.

8. A vehicle steering system as set forth in any of Claims 5 to 7, characterized in that the constant velocity universal joints are constant velocity ball universal
20 joints.

9. A vehicle steering system as set forth in any of Claims 5 to 7, characterized in that the connecting device is a spline connecting device or a serration connecting
25 device, and

a film of polyamide resin is formed on a surface of a connecting portion on at least either a male side or a female side of the spline connecting device or the serration connecting device.

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10. A vehicle steering system as set forth in any of Claims 5 to 8, characterized in that the connecting device is a serration connecting device, and

10 a biasing member is provided between the male side and the female side of the serration connecting device for applying a biasing force in a direction perpendicular to an axis thereof.

11. A vehicle steering system as set forth in any of 15 Claims 5 to 8, characterized in that the connecting device is a spline connecting device, and in that

the height of at least a tooth of the spline connecting device is made lower than the height of the other teeth.

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